

REMARKS

This Amendment is in response to the Office Action mailed June 12, 2002. In the Office Action, claims 3-7, 10-15 and 18-22 were rejected under 35 U.S.C. §103(a). Applicants respectfully traverse the multiple §103(a) rejections in their entirety. Herein, claim 3 has been amended to include the limitation that the marking of the memory pages corresponding to regions of the image frame that have been updated is performed during the drawing operation as previously set forth in claim 10. Applicants respectfully contend that this amendment does not raise further issues.

I. REJECTIONS UNDER 35 U.S.C. § 103(a) – CLAIMS 3, 5, 10, 12, 15 AND 21-22

Claims 3, 5, 10, 12, 15 and 21-22 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,002,411 issued to Dye. Applicants respectfully disagree with the rejection because a prima facie case of obviousness has not been met. Dye teaches a Window Assembler that utilizes information in the Window Workspace buffer as well as information from the software driver regarding screen changes to assemble a Display Refresh List in system memory. *See col. 4, lines 33-47 of Dye*. The Display Refresh List includes information concerning *each* window appearing on a display screen. *See col. 4, lines 18-19 & 33-36 of Dye*. The pointer-based display refresh system does not implement a display controller to send *only* marked memory pages to the image frame of the display as set forth in claims 3, 12 and 15. A “marked memory page” corresponds to a region of an image frame that has been updated (modified) while the drawing operation is being performed, unlike the contents of the Display Refresh List featuring information concerning all windows appearing on the display screen whether or not they have been recently updated during a drawing operation.

Hence, Applicants respectfully request withdrawal of the above-cited §103(a) rejection.

II. REJECTIONS UNDER 35 U.S.C. § 103(a) – CLAIMS 4, 11, 18

Claims 4, 11 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Dye in view of Broemmelsiek (US Patent No. 5,574,836). On page 4 of the Office Action, it is stated that Dye does not teach a system where the image frame is *divided into tiles representing two-dimensional regions of the image frame, each of the tiles is stored in one separate memory page*. While Applicants agree that Dye fails to teach such a system, Applicants disagree that such teachings or suggestions are found in Broemmelsiek. In particular, column 4, lines 32-47 of Broemmelsiek describes an object buffer being composed of “a pool to allocable tiles from a read-writable random access memory.” The graphics engine writes an object image *to a series of tiles*. See lines 35-36 of Broemmelsiek. These tiles are designed for storage of objects, in contrast with the claimed invention in which each tile is part of the image, namely representing a two-dimensional region of the image frame and being stored in one separate memory page as set forth in Claims 4, 11 and 18.

In light of the foregoing, Applicants respectfully request withdrawal of the rejection.

III. REJECTIONS UNDER 35 U.S.C. § 103(a) – CLAIMS 6, 7, 13, 14, 19, 20

Claims 6, 7, 13, 14, 19, 20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Dye in view various secondary references. While these rejections are traversed in their entirety, further discussion as to the grounds for reconsideration is not necessary due to the allowability of the independent claims 3, 10 and 15 from which these claims depend. Allowance of these claims is respectfully requested.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

1           1.       Cancelled.

1           2.       Cancelled.

1           3.       (Twice Amended) A system to refresh a display, the system comprising:  
2           a memory to store images of an image frame in a plurality of memory pages;  
3           a processor to perform drawing operations to generate the images for the image frame,  
4           the processor marking memory pages corresponding to regions of the image frame that have  
5           been updated while performing the drawing operations; and  
6           a display controller in communication with the memory to access the image frame and to  
7           send only the marked memory pages of the image frame to the display to refresh the display.

1           4.       (Amended) The system of claim 3, wherein the image frame is divided into tiles  
2           representing two-dimensional regions of the image frame, each of the tiles is stored in one  
3           separate memory page.

1           5.       (Amended) The system of claim 3, wherein each of the memory pages has a size  
2           of four Kilobytes.

1           6.       (Amended) The system of claim 3, wherein the image frame is represented by a  
2           configuration where color components of a pixel are deposited in contiguous memory locations.

1           7.       (Amended) The system of claim 3, wherein the image frame is represented by a  
2           configuration where color components of a pixel are separated and deposited in multiple color  
3           planes.

1           8.       Cancelled.

1           9.       Cancelled.

1           10.    (Amended) A method to refresh a display, comprising:  
2           storing at least one image frame such that content of the image frame is stored in a  
3           plurality of memory pages in a memory;  
4           marking memory pages corresponding to regions of the image frame that have been  
5           updated while performing drawing operations; and  
6           sending only the marked memory pages of the image frame to the display to refresh the  
7           display.

1           11.    (Amended) The method of claim 10 further comprising:  
2           dividing the image frame into tiles representing two-dimensional regions of the image  
3           frame; and  
4           storing each of the tiles in one separate memory page.

1           12.    (Amended) The method of claim 10 further comprises using memory pages of  
2           four Kilobytes in size.

1           13.    (Amended) The method of claim 10 further comprises organizing the image  
2           frame using a configuration where color components of a pixel are deposited in contiguous  
3           memory locations.

1           14.    (Amended) The method of claim 10, further comprises organizing the image  
2           frame using a configuration where color components of a pixel are separated and deposited in  
3           multiple color planes.

1           15.    (Amended) A program embodied on a system-readable medium to refresh a  
2           display, comprising:  
3           a first sub-program to control storing at least one image frame in a memory such that  
4           content of the image frame is stored in a plurality of memory pages in the memory;  
5           a second sub-program to mark memory pages corresponding to regions of the image  
6           frame that have been updated while performing drawing operations; and

7 at least one sub-program to access the image frame and to send only the marked memory  
8 pages of the image frame one memory page at a time to the display to refresh the display.

1 16. Cancelled.

1 17. Cancelled.

1 18. The program of claim 15 further comprising:  
2 a third sub-program to divide the image frame into tiles representing regions of  
3 the image frame and to store each tile in a separate memory page.

1 19. The program of claim 15 further comprising:  
2 a third sub-program to organize the image frame using a configuration where color  
3 components of a pixel are deposited in contiguous memory locations.

1 20. The program of claim 15 further comprising:  
2 a third sub-program to organize the image frame using a configuration where  
3 color components of a pixel are separated and deposited in multiple color planes.

1 21. The system of claim 3, wherein the display controller sends the image frame one  
2 memory page at a time to the display to refresh the display.

1 22. The method of claim 10, wherein the sending of the marked memory pages of the  
2 image frame to the display to refresh the display further comprises sending the marked memory  
3 pages one memory page at a time.

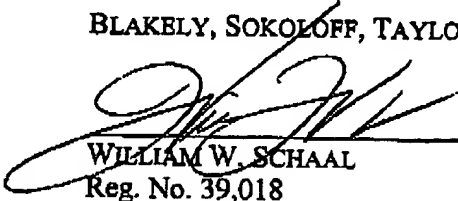
CONCLUSION

In view of the amendments and remarks made above, it is respectfully submitted that all pending claims are in condition for allowance, and such action is respectfully solicited.

Respectfully submitted,

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